

Two new triggerplants (*Stylidium*; Stylidiaceae) from the eastern margin of the Swan Coastal Plain, Western Australia

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Abstract

Wege, J.A., Keighery, G.J. & Keighery, B.J. Two new triggerplants (*Stylidium*; Stylidiaceae) from the eastern margin of the Swan Coastal Plain, Western Australia. *Nuytsia* 17: 445–452 (2007). *Stylidium ferricola* Wege & Keighery and *S. korijekup* Wege, B.J.Keighery & Keighery are newly described. *Stylidium ferricola* is endemic to the southern ironstones near Busselton and is distinctive in the genus on account of its compact, rosetted habit, narrowly-oblong leaves with entire margins and a hair-like mucro, paniculate inflorescences, oblong to cylindrical hypanthia bearing glandular trichomes, and vertically-paired corolla lobes. *Stylidium korijekup* is known from a single population occurring on laterite soils near Harvey and is characterised by a cormaceous habit, petiolate leaves, glabrous scapes bearing scattered sterile bracts, paniculate inflorescences, glabrous hypanthia and calyces, creamy-yellow and laterally-paired corolla lobes, and six, oblong, red-tipped throat appendages. Both species are flagged as being of conservation concern.

Introduction

This paper serves to describe two new, geographically restricted triggerplants of conservation concern. *Stylidium ferricola* Wege & Keighery is known from two herbarium collections acquired in 1993 during floristic surveys of the winter-wet shrublands of the southern Swan Coastal Plain and Whicher Scarp ironstones, near Busselton (Figure 1). These species-rich shrublands are characterised by significant numbers of restricted, endemic taxa and, as a result of extensive agricultural clearing, are considered to be amongst the most threatened plant communities in Western Australia (Gibson *et al.* 1994; English 1999; Gibson *et al.* 2000). The second species, *S. korijekup* Wege, B.J.Keighery & Keighery, was discovered by one of us (BJK) in 2005 during a preliminary survey of remnant bushland near Harvey (Figure 1), jointly conducted by the Department of Environment and Conservation (DEC) and the Wildflower Society of Western Australia (Inc.). This species is confined to the crest and eastern face of a steep ridge located on the eastern margin of the Swan Coastal Plain and composed of unusual stony soil. No additional populations are known. Both species are very distinct within the triggerplant genus and are described in advance of the “Flora of Australia” revision in view of their apparent rarity.

Methods

The species descriptions are based upon examination of herbarium specimens and field photographs. No spirit material was available for study. A single flower from the type of *S. korijekup* was rehydrated in hot water and a small amount of detergent and subsequently examined for critical features. This approach was unsuccessful in the case of *S. ferricola* due to the delicate nature of the flowers and the age of the specimen. The descriptions for both species will require revision, pending availability of fresh flowers and/or flowers preserved in spirit. The distribution maps were compiled using DIVA-GIS freeware Version 5.2.0.2. Precise locality information for both species has been withheld in view of their rarity.

Taxonomy

Stylidium ferricola Wege & Keighery, *sp. nov.*

Herbae perennes 9–15 cm altae; folia rosulatae, anguste oblanceolatae, mucronatae, marginibus integeris, glabrae; inflorescentiae paniculae; hypanthia oblonga, glandulosa; calycis segmenta glabra.

Typus: Whicher Range, Western Australia [precise locality withheld for conservation purposes], 4 November 1993, G.J. Keighery 12932 (*holo*: PERTH 05472148; *iso*: MEL).

Stylidium sp. ironstone (G.J. Keighery 12932), Western Australian Herbarium, in FloraBase, <http://florabase.dec.wa.gov.au> [accessed June 2007].

Caespitose perennial herb 9–15 cm high. *Trichomes* glandular, 0.3–0.5 mm long; stalks translucent to yellowish, straight or bent; heads red-black, ellipsoid; eglandular trichomes absent. *Stems* partly buried, thickened, branched or unbranched, bearing persistent straw-coloured leaf bases. *Leaves* rosulate, narrowly-oblanceolate, apex a hair-like mucro to 4 mm long, margin entire, 1–2 cm long, 1–1.7 mm wide, glabrous. *Scapes* with or without a single sterile bract below the inflorescence, 7.5–13 cm high, 0.5–1 mm wide, glabrous at base, becoming glandular towards apex. *Inflorescence* c. 4–40-flowered, paniculate; units 1.2–4.5 cm long, 2–9-flowered; bracts ovate, 2–4 mm long, apex acute to mucronate, margin narrowly hyaline, glabrous; bracteoles similar but shorter and narrower; pedicels to 3 mm long, glandular. *Hypanthium* oblong to cylindrical, compressed in T.S., 3–8 mm long, 0.5–1.2 mm wide, moderately to sparingly glandular. *Calyx lobes* part-fused (3 free, 2 fused for more than half of length), apex subacute to obtuse, margin narrowly hyaline, c. 1.2–2 mm long, glabrous. *Corolla* tube as long or slightly longer than calyx lobes; lobes cream with pinkish-red edges and throat markings, vertically-paired, anterior (upper) lobes narrowly ovate to elliptic and larger than the posterior lobes, posterior lobes elliptic, abaxial surface glandular. *Labellum* boss ovate, margin and lateral appendages papillose. *Throat appendages* absent. *Column* c. 9.5–12.5 mm long, glabrous; anther locules positioned obliquely relative to column, red-black, subtending hairs present; stigma not viewed. *Mature capsules* and seed not viewed. (Figure 2)

Other specimen examined. WESTERN AUSTRALIA: [locality withheld] 11 Nov. 1993, B.J. Keighery & N. Gibson 623 (PERTH).

Distribution. Restricted to the massive ironstones of the Whicher Scarp, adjacent to the Swan Coastal Plain, south of Busselton (Figure 1).

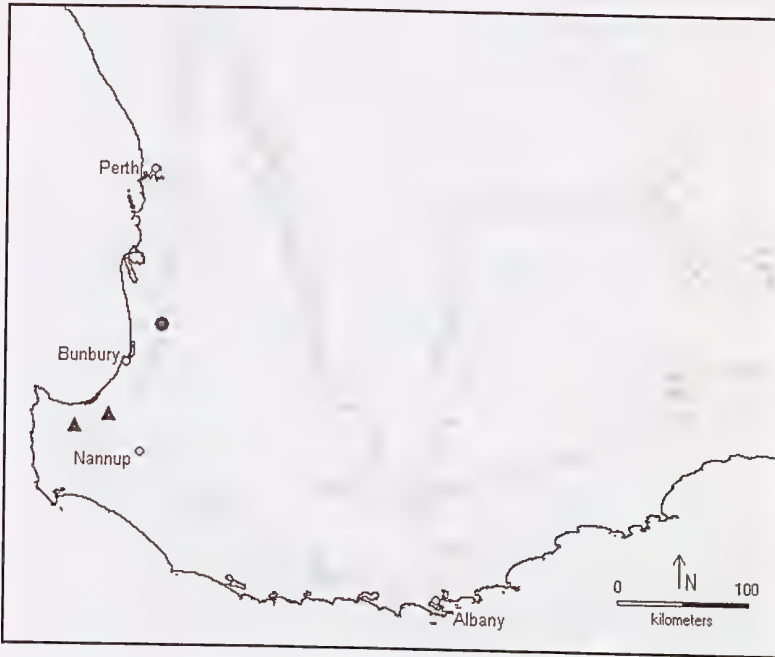


Figure 1. Distribution of *Stylidium ferricola* (▲) and *S. korijekup* (●) in south-west Western Australia. Version 6.1 IBRA regions (Department of the Environment and Water Resources 2007) are indicated in grey.



Figure 2. *Stylidium ferricola* (G.J. Keighery 12932). A – an individual from the holotype (PERTH 05472148), scale bar at 5 cm; B – habit, photograph by Greg Keighery.

Habitat. Seasonally wet, poorly-drained slopes. Shallow red-brown clay loam over ironstone. Recorded from burnt low heath (G.J. Keighery 12932) and scrub with *Hakea oldfieldii*, *Dryandra squarrosa* subsp. *argillacea* and *Pericalymma ellipticum* (B.J. Keighery & N. Gibson 623).

Phenology. Flowering in late October and November.

Conservation status. *Stylidium ferricola* was recently listed as Priority One under DEC Conservation Codes for Western Australian Flora. It is known from two occurrences of a Threatened Ecological Community (TEC), both of which are associated with the Whicher Scarp and located within State Forest. This TEC and the adjacent Whicher Scarp and Swan Coastal Plain areas have been the subject of considerable survey effort over the past 15 years (Gibson *et al.* 1994; English 1999; Keighery 1999; Gibson *et al.* 2000; Government of Western Australia 2000). Despite this intensive survey effort, no additional populations of *S. ferricola* have been recorded and we therefore consider it endemic to this ecological community.

Etymology. Named for its ironstone habitat preference.

Spotting features. *Stylidium ferricola* can be distinguished from other species of *Stylidium* by the following combination of characters: a compact rosette of glabrous leaves with entire margins and a hair-like apical mucro; a paniculate inflorescence; an oblong to cylindrical hypanthium bearing glandular hairs (eglandular hairs absent); glabrous calyx lobes; and vertically-paired corolla lobes.

Affinities. A compact rosette of fibrous leaves and an oblong to cylindrical hypanthium is a distinctive character combination shared by several perennial species of *Stylidium* Sw. endemic in south-west Western Australia. Of these, *S. tenuicarpum* Carlquist, *S. drummondianum* Lowrie & Carlquist and *S. pubigerum* Sond. can be readily distinguished from *S. ferricola* by their eglandular scape indumentum. *Stylidium coroniforme* F.L.Erickson & J.H.Willis and *S. amabile* Wege & Coates differ in having laterally-paired corolla lobes bearing throat appendages, a hypanthium which is sterile in one locule, and a labellum with long lateral appendages.

On the basis of habit and floral morphology, *S. ferricola* appears most closely allied to two undescribed taxa: *S. sp.* Banovich Road (F. & J. Hort 1884) and *S. sp.* Dewars Pool (K.F. Kenneally 11400). Unlike *S. ferricola*, these two taxa possess leaves with finely serrate margins, inflorescences with an indumentum of both glandular and eglandular trichomes, and hairy calyx lobes. Formal recognition of these taxa is in progress (K.F. Kenneally, pers. comm.).

Notes. The type collection of *S. ferricola* was made the year subsequent to a hot fire, at which time it was observed by one of us (GJK) to occur in large numbers. It had not been noted during previous surveys of the area, and has not been seen during recent searches. Many perennial triggerplants appear to be disturbance opportunists, occurring in high numbers following temporary habitat perturbations such as fire. For example, *S. coroniforme*, a similarly rare and relatively short-lived species, is also disturbance-adapted and has population systems which undergo frequent bottleneck-flush cycles (Coates 1992).

Stylidium korijekup Wege, B.J.Keighery & Keighery, *sp. nov.*

Stylidio applanato Wege affinis, a qua imprimis differt petiolis gracilibus, hypanthio elliptico et faucis appendiculatis paucioribus.

Typus: near Harvey, Western Australia [precise locality withheld for conservation purposes], 7 October 2006, G.J. Keighery & B.J. Keighery 801 (*holo*: PERTH 07537239).

Stylidium sp. Korijekup (G.J. Keighery & B.J. Keighery 801), Western Australian Herbarium, in FloraBase, <http://florabase.dec.wa.gov.au> [accessed June 2007].

Perennial herb c. 18–34 cm high. *Trichomes* glandular, 0.1–0.3 mm long; stalks translucent, straight; heads red, disciform to subglobose; eglandular trichomes absent. *Stems* cormaceous, sheathed by persistent leaf bases; stilt roots absent. *Leaves* in a spreading rosette, somewhat adpressed to the soil surface, spatulate (lamina ovate–elliptic), apex obtuse–subacute, margin entire, 4–6 cm long (petioles 3–4 mm long, lamina 1.4–2 cm long), 9–16 mm wide, glabrous. *Scape* bearing scattered sterile bracts below the inflorescence, c. 18–34 cm high, 0.7–1.2 mm wide, glabrous throughout length. *Inflorescence* c. 14–17+ flowered, paniculate; units 1.5–3.5 cm long, 1–2-flowered; bracts subulate, 2.5–7 mm long, apex subacute, margin entire, glabrous; bracteoles positioned near base of petioles, similar to bracts but shorter; pedicels c. 3–7 mm long, sparingly glandular. *Hypanthium* ellipsoid, slightly compressed in T.S., c. 3–4 mm long, 1.5–2 mm wide, glabrous. Calyx lobes free, apex subacute, margin entire, 2.5–3.5 mm long, glabrous. *Corolla* tube shorter than calyx lobes; lobes cream, yellow in bud, stained maroon on reverse, laterally-paired, narrowly ovate, c. 4–6 mm long, c. 2.5–3 mm wide, glabrous. *Labellum* reflexed and twisted across calyx lobes; boss ovate, c. 1 mm long, c. 0.7–0.8 mm wide, margin entire, lateral appendages c. 0.2 mm long, terminal appendage c. 1 mm long. *Throat* bearing 6 oblong–tooth-like appendages interspersed with 3 swollen mounds, the former 0.2–0.6 mm high, yellowish with maroon tips. *Column* c. 10–11 mm long, base and hinge yellow, distal end maroon, glabrous; anthers positioned parallel relative to column, red-black, subtending hairs absent; stigma sessile, entire. *Capsules* clavoid, c. 4–5 mm long. Seed not viewed. (Figure 3)

Other specimen examined. WESTERNAUSTRALIA: [locality withheld] 21 Oct. 2005, G.J. Keighery & B.J. Keighery s.n. (MEL, PERTH).

Distribution. Known only from the type locality, near Harvey (Figure 1).

Habitat. Upland ridge. Well drained grey-brown sandy loam with laterite. *Eucalyptus marginata* and *E. haematoxylon* woodland with *Xanthorrhoea acanthostachya* and *X. gracilis*.

Phenology. Flowers recorded for early October.

Conservation status. Recently listed as Priority One under DEC Conservation Codes for Western Australian Flora. *Stylidium korijekup* is known from only two collections from a single population of about 30 plants. This population occurs on a stony ridge in a vegetation community that contains floristic elements of both the Ridge Hill Shelf (i.e. the foothills of the Darling Range) and the adjacent Darling Scarp. The vegetation on the ridge, including *S. korijekup*, is subject to heavy grazing by kangaroos. Both the Darling Scarp and Swan Coastal Plain have been extensively surveyed over the past 15 years (Gibson *et al.* 1994; Markey 1997; Keighery 1999; Government of Western Australia 2000) and no other similar habitat has been located. Work is currently underway to characterise the community and to determine if it should be recognised as a TEC.

Etymology. Korijekup was the name originally given to the town of Harvey (Staples 1979). It originates from the Nyooongar word korridg-e-cup—the name given by Aborigines from the Harvey region to the red-tailed black cockatoo (Bindon & Chadwick 1992) or the place of the red-tailed black cockatoo

(Staples 1979). Red-tailed black cockatoos have been observed on each investigation of the population. The epithet is formed as a noun in apposition.

Spotting features. Distinctive for its cormaceous habit, petiolate leaves, glabrous scape bearing scattered sterile bracts, paniculate inflorescences, glabrous hypanthia, and creamy-yellow flowers with short, red-tipped throat appendages.

Affinity. *Stylidium korijekup* appears to be morphologically allied to *S. applanatum* Wege, a species known only from the Corrigin area some 200 km to the north-east (Wege 2007, this issue). *Stylidium applanatum* and *S. korijekup* each possess a flattened leaf rosette, scapes with scattered bracts, paniculate inflorescences, glabrous hypanthia and calyx lobes, yellow, laterally-paired corolla lobes bearing maroon-tipped throat appendages and clavoid capsules. They are most readily differentiated by their leaves: broader in *S. korijekup* and with slender petioles, the bases of which form a distinct sheath around the stem tissue. The lower inflorescence units of *S. applanatum* are longer than those of *S. korijekup* and often bear three flowers rather than two. The six oblong to mounded throat appendages of *S. korijekup* are morphologically distinct from the eight truncate appendages possessed by *S. applanatum*.

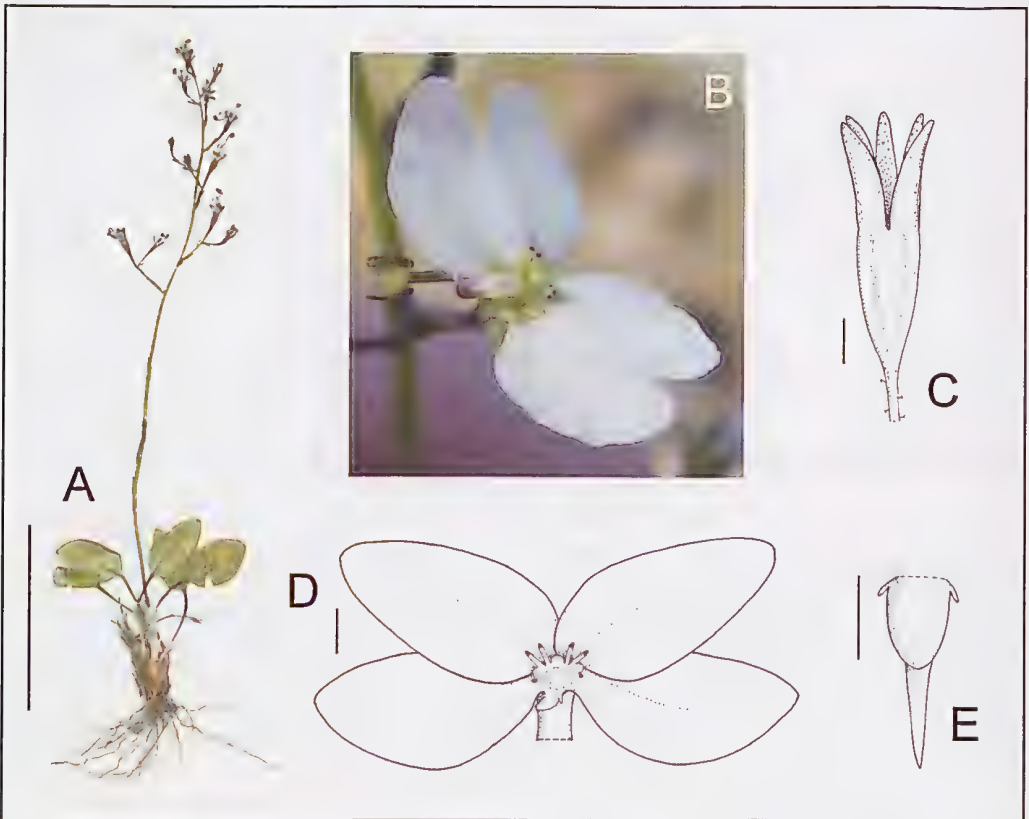


Figure 3. *Stylidium korijekup* (G.J. Keighery & B.J. Keighery 801). A – holotype (PERTH 07420137); B – flower, photograph by Bronwen Keighery; C – hypanthium and calyx lobes; D – corolla lobes and throat appendages; E – labellum. Scale = 5 cm (A) and 1 mm (C–E).

Notes. Over the winter and spring period of 2005 and 2006, the type locality was inspected for flowering material on at least six occasions. Post-flowering plants were observed and collected in 2005, however, only a single flowering plant was observed in 2006. Whilst this very poor flowering may be a result of below average rainfall, this phenomenon has been observed to occur in non-drought years in populations of the cormaceous species *S. diversifolium* R.Br. and *S. carnosum* Benth. Both of these species respond well to fire, regenerating from the corm which is usually buried several centimetres below the soil surface.

A new population of the Priority Four species *S. plantagineum* Sond. was observed at the type locality of *S. korijekup*, on the crest and southern face of the same ridge. This population (G.J. Keighery & B.J. Keighery 961) represents the most northern record for this species.

Acknowledgements

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